Forest Insect Laboratory
Berkeley, California
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FOREST INSECT SURVEYS - MODOC NATIONAL FOREST

Season of 1936

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INTRODUCTION

The 1936 insect loss survey of the Modoc National Forest was made by the Bureau of Entomology and Plant Quarantine between the middle of September and the end of October. The examination included the Happy Camp-Lava Beds area and a small portion of the North Warner district. A series of fourteen 320-acre plots (see map) were cruised and these form the basis of the loss estimates.

One of the purposes of the survey was the continuation of loss records for the Happy Camp-Lava Beds area. This provides a continuous record of year-to-year losses beginning in 1921; a valuable asset in following the trend of barkbeetle infestations.

A slightly different method of recording losses is used which takes cognizance of the fact that much of the area in several infestation units is being cutover. Since the rates of loss on cutover and virgin stands are quite different in most instances, it becomes necessary to make some differentiation between the two classifications. A cutover survey was initiated by the Bureau in 1934 while the amount of cutover lands on the Modoc was relatively small. Logging has since been undertaken on a scale which makes necessary the enlargement of sampling methods for accurate determination of losses on cutover areas. It is therefore intended that this feature of the insect loss survey be amplified as conditions warrant.

GENERAL INFESTATION CONDITIONS

Characteristics:

Severe epidemic conditions were reached over most of the area in the summer and late fall of 1934. This condition was accompanied by large per-acre losses, heavy grouping of attacks, and the selection of many trees usually classed as resistant to insect attack. The peak of the epidemic occurred chiefly in the fringe stands type of marginal type in 1934. This included the belt of timber extending from Glass Mountain on the west through Timber Mountain, Plum Ridge, Deer Hill to Badger Well. The effect of the epidemic was not complete in the better sites in the vicinity of Happy Camp, Sugar Pine Ridge, and Pit River until 1935. A decline in losses was noticeable during the 1935 season and continued in force during 1936. A return to a normal infestation is progressing as indicated by the reduced losses, the cessation of grouped attacks except on the better sites where a slight amount of grouping still prevailed, and the increased volume of the individual trees attacked. These factors are apparent in the summarized losses presented in Tables I and II.

Based upon the peak losses of 1934, the infestation dropped approximately 37 percent in 1935 and it is estimated that the 1936 loss diminished to 35 percent of the 1934 figure. In spite of this optimistic trend, the losses for 1936 still remain from four to seven times the rate of growth known to exist on this area.

Composition of Infestation:

The decrease in the infestation has brought about a change in the composition of attacks. During the peak of the loss cycle in 1934 or 1935, depending on the site, the western pine beetle, Dendroctonus brevicomis Lec., was by far the chief factor in initiating attacks. Stem analysis records secured in 1935 showed that the western pine beetle initiated attacks in 80 percent of the trees analysed. Flatheads initiated attack in but 12 percent of those trees. However, in 1936 flathead borers assumed greater importance. They initiated attacks in 26 percent of the trees as compared to 58 percent by the western pine beetle. The so-called "secondary" insects have also been found to be more important during 1936. These include the engraver beetles, Ips emarginatus Lec., and Ips oregoni Eich., and the mountain pine beetle, D. monticolae Hopk.

LOSSES IN CUTOVER STANDS

Approximately 66,700 acres in the Happy Camp-Lava Beds area have been logged since 1932. Two large units, Glass Mountain and Whitehorse are now 50 percent cutover. This condition is introducing a problem of increasing importance in the reporting of insect losses. A 320-acre check plot was established in 1934 on the east half of Section 20, T.43N, R5E., in a typical stand cut in 1930 for the purpose of studying the infestation of cutover stands. Though this is admittedly a small sample of the rapidly increasing cutover acreage, nevertheless it serves to indicate the scope of insect loss in this type of timber. The loss on the above check plot is shown as follows on a per-acre basis.

Year	No. of Trees	B.M. Volume
1934	.08	12.9
1935	.12	19.5
1936 (Est.)	.07	12.5

This plot, having a pine stand in 1931 of 8.5 trees and 1,055 b.m. per acre and with an annual increment of 23 b.m., is in a favorable position when compared to virgin stands in the same locality. The ratio of increment to loss in particular is in marked contrast to that on virgin stands and offers a ray of hope in the management of eastside pine stands.

TABLE I

PLOT LOSSES - MODOC NATIONAL FOREST

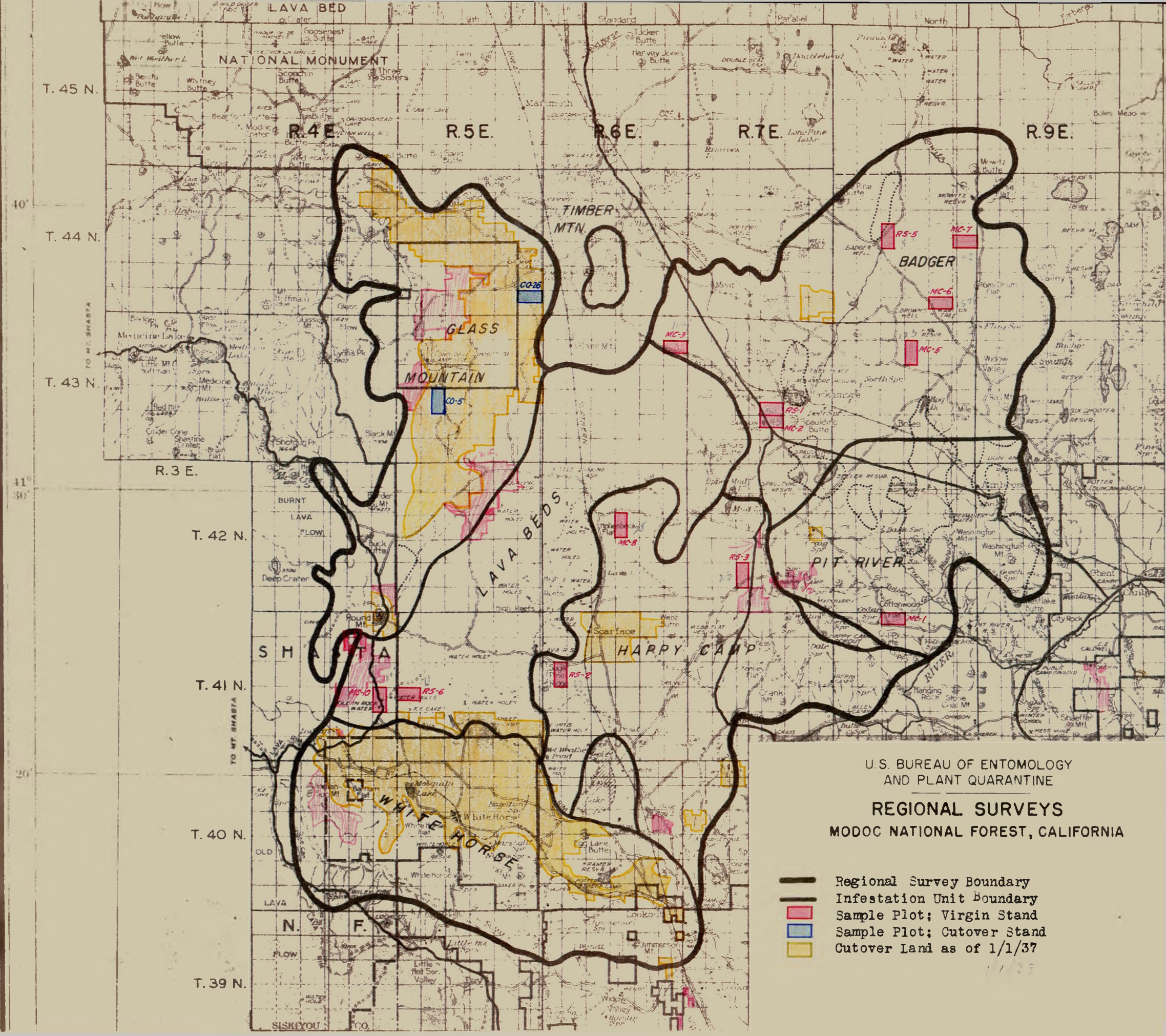
PER SECTION BASIS

PLOT	1934 Loss				1935				1936 (CSS)			
	Timbered Acreage	Trees	B.M. Volume	B.M. per Acre	Trees	B.M. Volume	B.M. per Acre	% 1934 Loss	Trees	B.M. Volume	B.M. per Acre	% 1935 Loss
RS-1	289	378	324,960	508	334	235,760	368	72.4	160	152,900	239	64.9
RS-2	320	336	321,600	503	618	463,220	724	143.9	109	76,200	119	16.4
RS-3	298	224	212,580	332	178	132,280	207	62.3	35	45,110	70	33.8
RS-4	314	586	135,140	468	336	164,840	258	55.1	CUTOVER SPRING 1936			
RS-5	300	220	164,340	257	256	167,240	261	101.6	64	52,640	82	31.4
RS-6	307	142	115,840	181	118	112,700	176	97.2	115	69,040	108	61.4
RS-11	314	144	164,860	258	88	104,000	163	63.2	57	58,130	91	55.8
MC-1	320	188	125,100	195	310	184,360	288	147.7	74	58,260	91	31.6
MC-2	278	322	252,600	395	340	282,020	441	111.6	118	139,650	218	49.4
MC-3	300	612	624,520	976	280	279,060	436	44.7	139	138,120	216	49.5
MC-4	300	362	289,940	453	CUTOVER 1935							
MC-5	261	70	58,180	91	86	58,160	91	100.0	32	16280	25	27.5
MC-6	316	216	193,940	303	244	233,200	364	120.1	46	23,430	37	10.2
MC-7	301	194	151,760	237	270	188,320	294	124.1	66	78,310	122	41.5
MC-8	320	388	280,020	438	314	191,700	300	68.4	129	100,710	157	52.3
MC-10	300	114	135,140	211	56	81,460	127	60.2	64	54,000	84	66.1
AVERAGES				363			283	78.0			119	42.0

TABLE II

LOSS ON VIRGIN STANDS - MODOC N. F.

UNIT	1934 Loss					1935 Loss					1936 Loss (Est.)				
	Timbered Acreage	Per Acre No.	Per Acre BM Vol.	Per Unit No.	Per Unit MBM Vol.	Timbered Acreage	Per Acre No.	Per Acre BM Vol.	Per Unit No.	Per Unit MBM Vol.	Timbered Acreage	Per Acre No.	Per Acre BM Vol.	Per Unit No.	Per Unit MBM Vol.
Glass Mtn.	46,374	.31	213.7	14,376	9,910	46,374	.23	161.9	10,666	7,508	38,385	.20	151.5	7,677	5,815
Badger	85,185	.46	402.4	39,185	34,278	85,185	.40	322.3	34,074	27,455	85,185	.14	134.2	11,926	11432
Happy Camp	62,887	.46	401.1	28,928	25,224	62,887	.50	359.2	31,444	22,589	59,962	.12	117.2	7,195	7,028
Lava Beds	78,033	.40	316.8	31,213	24,721	78,033	.31	225.6	24,190	17,604	77,697	.17	126.7	13,208	9,844
Pit River	31,720	.20	130.3	6,344	4,133	31,720	.32	192.0	10,150	6,090	31,720	.50	136.5	5,392	4,330
Timber Mtn	1,600	.70	367.0	1,120	587	1,600	1.20	316.0	1,920	506	1,600	.50	85.0	800	13,600
TOTALS - Happy Camp-Lava Beds Area	305,799			121,166	98,853	305,799			112,444	81,752	294,549			46,198	52,049
Buck Creek:	1,613	.23	259.4	371	418	1,613	.14	162.5	226	262	1,613	.09	90.8	145	146



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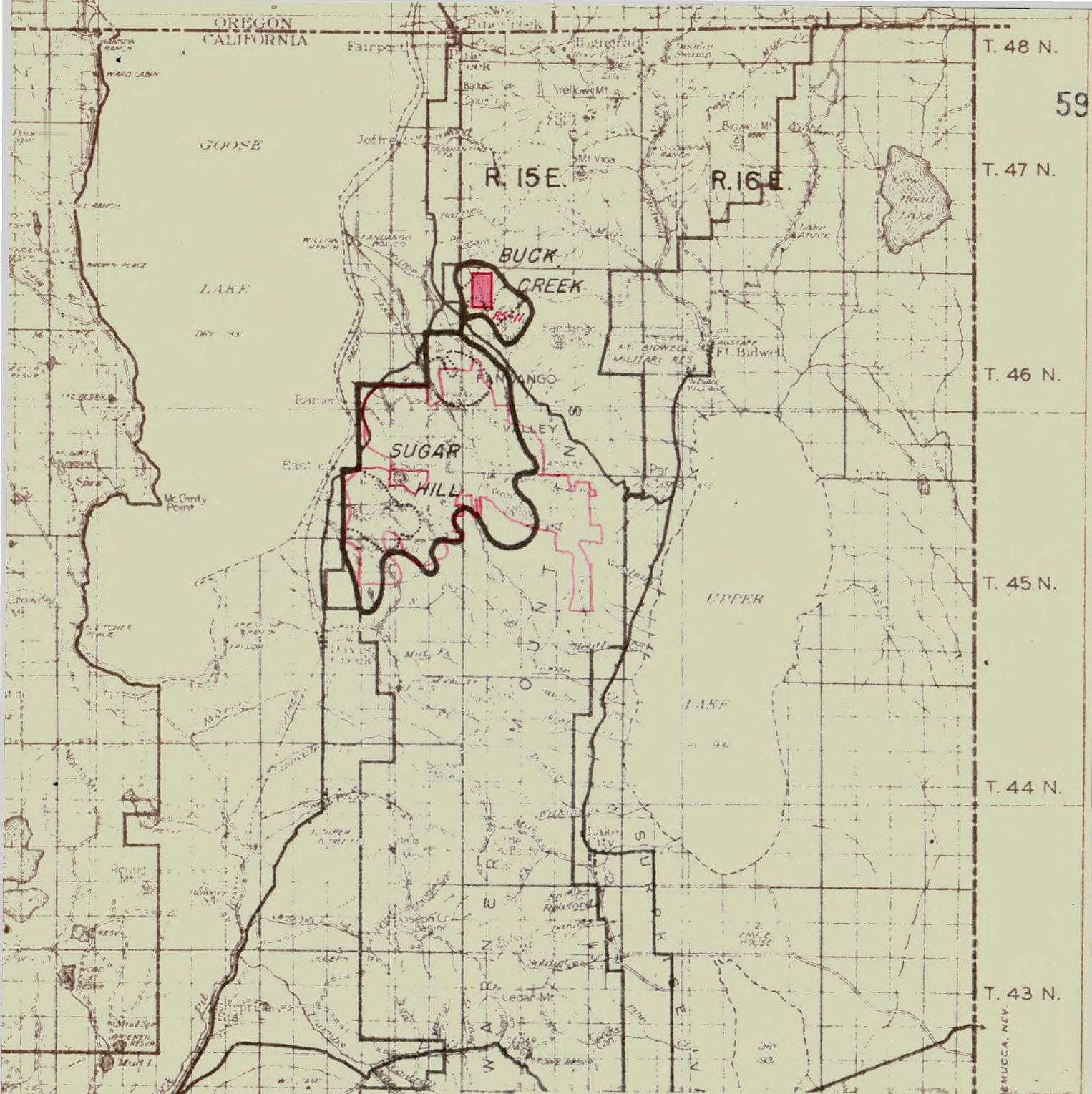
REGIONAL SURVEYS

MODOC NATIONAL FOREST, CALIFORNIA

- Regional Survey Boundary
- Infestation Unit Boundary
- Sample Plot; Virgin Stand
- Sample Plot; Cutover Stand
- Cutover Land as of 1/1/37



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REGIONAL SURVEYS

MODOC NATIONAL FOREST, CALIFORNIA

Infestation Unit Boundary

Sample Plot; Virgin stand

A P P E N D I X

1935 Unit Losses:

Glass Mountain	RS-4 x1) RS-6 x1)	Divide by 2
Badger	RS-1 x1) RS-5 x1) MC-2 x1) MC-3 x1) MC-4 x1) MC-5 x1) MC-6 x1) MC-7 x1)	Average
Happy Camp	RS-2 x1) RS-3 x2) MC-8 x1)	Divide by 4
Lava Beds	RS-6 x1) MC-10 x1)	Divide by 2
	MC-8 x1)	Divide by 4
Pit River	MC-1 x2/3	
Timber Mountain	Uncut plot (South 20 acres) x1	
Buck Creek	RS-11 x1	

1936 Unit Losses:

Same as 1935 for all units except the following:

Glass Mountain Cut 1935 unit loss 55% for number of trees
" " " " 67% " B. M. Volume

1936 Plot Losses:

RS-1	60	percent	MC-1	70	percent
2	70	"	MC-2	80	"
3	85	"	3	85	"
5	90	"	5	85	"
6	75	"	7	85	"
11	60	"	6	70	"
		"	8	70	"
			10	75	"